

LISTING OF THE CLAIMS

- 1) (Cancelled) A method for groundmapping with a Synthetic Aperture Radar system comprising the steps of:
 - transmitting a series of stepped frequency chirped pulse pairs towards a terrain of interest; and
 - processing target echo return signals from the terrain of interest to develop a terrain map thereby.
- 2) (Cancelled) A method, as defined in Claim 1, wherein said transmitting step comprises transmitting a series of first and second chirped pulse pairs wherein said second chirped pulse pair always has a frequency higher than the first pulse pair.
- 3) (Cancelled) A method, as defined in Claim 2 wherein said transmitting step comprises transmitting a chirped pulse using $\Phi_m^T(t, n) = f_m t + \frac{\gamma}{2}(t - t_n)^2$, and wherein said processing step comprises processing $\Phi_m^R(t, n) = f_m(t - \tau_{t,m}) + \frac{\gamma}{2}(t - t_n - \tau_{t,m})^2$ as a received signal by dechirp processing which mixes the received signal with a reference signal composed of: $\Phi_m^{REF}(t, n) = f_m t + \frac{\gamma}{2}(t - t_n - \tau_{t,m})^2$ where

γ equals a chip slope, n equals a pulse index, and a reference point at step m will be denoted by $\tau_{t,m}$ and $\tau_{s,m}$ where new time variable $\hat{t} = t - t_n$.

- 4) (Original) A method for groundmapping with a Synthetic Aperture Radar system comprising the steps of:
- transmitting a series of stepped frequency chirped pulse pairs toward a target of interest to generate target echo return signals in a data system;
 - dechirping the target echo return signals in the data stream to produce pairs of sub-pulse range samples;
 - combining pairs of sub-pulse range samples to produce a synthetic wide-band equivalent data stream; and
 - performing terrain mapping on the wide-band equivalent data stream.

- 5) (Original) A method for groundmapping, as defined in Claim 4, wherein said transmitting step comprises transmitting a series of first and second chirped pulse pairs wherein said second chirped pulse in the pair always has a higher frequency than the first chirped pulse in the pair.

- 6) (Original) A method, as defined in Claim 5, wherein said transmitting step comprises transmitting a chirped pulse using $\Phi_m^T(t, m) = f_m t + \frac{\gamma}{2}(t - t_n)^2$, and wherein said dechirping step comprises processing

$$\Phi_m^R(t, n) = f_m(t - \tau_{t,m}) + \frac{\gamma}{2}(t - t_n - \tau_{t,m})^2 \text{ on a received signal by dechirp}$$

processing which mixes the received signal with a reference signal composed

$$\text{of: } \Phi_m^{REF}(t, n) = f_m t + \frac{\gamma}{2}(t - t_n - \tau_{s,m})^2 \text{ where } \gamma \text{ equals a chip slope, } n \text{ equals a}$$

pulse index, and reference point at step m will be denoted by $\tau_{t,m}$ and $\tau_{s,m}$

where new time variable $\hat{t} = t - t_n$.